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December 19,1995

Joel L. Davis
Program Manager/Officer ONR: 342
Office of Naval Research
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Dear Mr. Davis:

Please find enclosed the Quarterly Report and the Appendix for ONR Grant N00014-95-1-1312, entitled "Evaluation for Vibrotactile Systems in Helicopter Hover and EVA Environments." This Report is for the dates of September 1 through November 30, 1995.

Sincerely,

Dava J. Newman CB

Dava J. Newman
Assistant Professor of Aeronautics and Astronautics

DN:cb

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13. ABSTRACT (Maximum 200 words)

The vibrotactile (VT) advanced technology demonstration (ATD) introduces a novel human-machine interface, namely, haptic stimulation through a VT suit to improve military personnel performance. The complete vibrotactile (VT) suit system will include three main components: a sensor package to acquire motion and orientation information, a control computer that will condition and convert the sensor information into output drive signals, and the VT suit for the test pilots. Design solutions for a navigation sensor package to be used in helicopter hover and extravehicular activity (EVA) environments is currently being undertaken (See Ref. List).

Integrating an Inertial Navigation System (INS) with the Global Positioning System (GPS) has provided numerous benefits, and with the recent advaces in Kalman filtering techniques, the number continues to grow. In addition to increased navigation accuracy under dynamic conditions, tracking accuracy has improved, CPU time has decreased and crew workload has decreased. The dual IN/GP system has already proven its strength in a variety of capacities such as helicopter flight path control, flight path management, flight testing and helicopter approach. While research efforts continue to establish a portfolio for this dual system, much of the present attention had been given to reducing the development and acquisition costs.

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Appendix: ONR Grant N00014-95-1-1312, First Quarter Reference List

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